PB90-207978

PM-10 Open Fugitive Dust Source Computer Model Package. User's Manual

Environmental Protection Agency, Research Triangle Park, NC

Apr 90

U.S. Department of Commerce
National Technical Information Service
NTIS

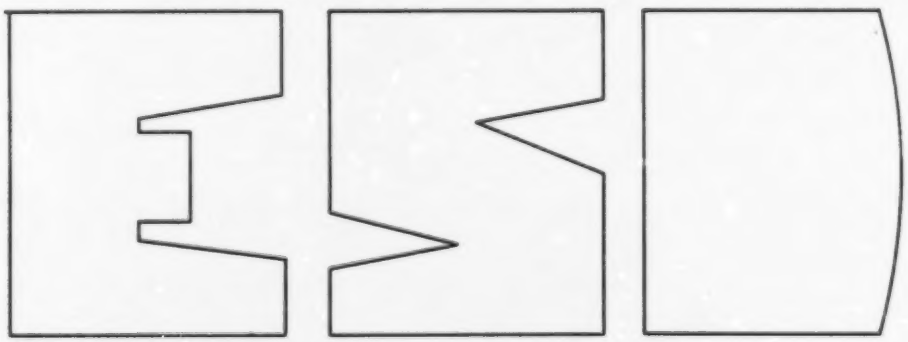
PB90-207978

United States Environmental Protection Agency | Office of Air Quality Planning and Standards Research Triangle Park NC 27711 | EPA-450/3-90-010 April 1990

Air

EPA

User's Manual for the PM-10 Open Fugitive Dust Source Computer Model Package



REPRODUCED BY
U.S. DEPARTMENT OF COMMERCE
NATIONAL TECHNICAL INFORMATION SERVICE
SPRINGFIELD, VA. 22161

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
EPA 450/3-90-010	EPA/SW/DK-90/031a	PB90-207978

4. TITLE AND SUBTITLE	5. REPORT DATE
User's Manual for the PM_{10} Open Fugitive Dust Source Computer Model Package	April 1990
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) Midwest Research Institute, 425 Volker Boulevard, Kansas City, MO 64110	8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Environmental Protection Agency, Office of Air and Radiation, Office of Air Quality Planning & Standards, Research Triangle Park, NC 27711	10. PROGRAM ELEMENT NO.
	11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS	13. TYPE OF REPORT AND PERIOD COVERED
	14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

For Diskette see: PB90-502022

16. ABSTRACT

The computer programs in this package are based on the material presented in the document, "Control of Open Fugitive Dust Sources, EPA-450/3-88-008." The programs on these diskettes serve two purposes. Their primary purpose is to facilitate the process of data entry, allowing the user not only to enter and verify the data which he/she possesses, but also to access additional data which might not be readily available. The second purpose is to calculate emission rates for the particular source category selected using the data previously entered and verified.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Agriculture Computer Program Construction Control Techniques Demolition Emission Estimates Fugitive Dust Open Areas PM_{10} Storage Piles		

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report)	21. NO. OF PAGES
Release Unlimited	Unclassified	34
	20. SECURITY CLASS (This page) Unclassified	22. PRICE A03

EPA Form 2220-1 (Rev. 4-77) PREVIOUS EDITION IS OBSOLETE

EPA-450/3-90-010

User's Manual for the PM-10 Open Fugitive Dust Source Computer Model Package

Emissions Standards Division

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711
April 1990

This report has been reviewed by the Emission Standards Division of the Office of Air Quality Planning and Standards, EPA, and approved for publication. Mention of trade names or commercial products is not intended to constitute endorsement or recommendation for use. Copies of this report are available through the Library Services Office (MD-35), U.S. Environmental Protection Agency, Research Triangle Park, NC 27711, or from National Technical Information Services, 5285 Port Royal, Springfield, VA 22161.

CONTENTS

		Page
1.	Introduction	1
2.	Required Equipment	3
3.	Program Installation	4
	3.1 Program installation to a hard drive	4
	3.2 Initiating the program after installation	6
	3.3 Program installation to a diskette	7
	3.4 Initiating the program installed on a diskette	9
	3.5 Initializing a new "data" diskette	9
4.	Overview of the Computer Model Package	11
5.	The "Mechanical" Programs	13
	5.1 MAIN MENU	13
	5.2 The ENTRY option (from the MAIN MENU)	14
	5.3 The VIEW option from the MAIN MENU	20
6.	The "Wind Erosion" Programs	26
	6.1 MAIN MENU	26
	6.2 The WIND option from the MAIN MENU	27
	6.3 The ENTRY option from the MAIN MENU	27
	6.4 The VIEW option from the MAIN MENU	30

SECTION 1.0

INTRODUCTION

The programs on these diskettes serve two purposes. Their primary purpose is to facilitate the process of data entry, allowing the user not only to enter and verify the data which he/she possesses, but also to access additional data which might not be readily available. The second purpose is, of course, to calculate emission rates for the particular source category selected using the data previously entered and verified.

The computer programs in this package are based on the material presented in the document, *Control of Open Fugitive Dust Sources*, EPA-450/3-88-008. This document is called the "reference document" throughout this user's manual and throughout the programs. It is recommended that the user have the reference document handy while he/she is first using the computer package.

All procedures, including data entry and verification, emission calculations, and outputting of results, are initiated by selecting an appropriate option from a list called the MAIN MENU. Depending on the option picked, the user will then be guided through the desired procedure with detailed on-screen instructions. In addition to the on-screen instructions and these user notes, HELP files are available at most steps. Whenever the user feels confused or wants clarification about the topic, the HELP feature can be employed. By following the instructions shown on the screen, the user will either (1) directly access HELP or (2) be led to a screen from which direct access to HELP is provided. The HELP feature provides definitions for terms with which the user might not be familiar. In addition, for certain variables, typical or suggested default values are given. For example, the number of days with significant rainfall is given for over 175 cities, and the mean annual wind speed is provided for over 120 cities. The user will find the HELP feature a very useful one at all stages of the data entry process.

On the following pages, the user will find a detailed discussion of how to install and use the programs. It is important to note that the users may find that the computer-generated emissions differ in some cases from estimates based on the example calculations described in the reference document. For example, the reference document presents an emission factor for truck hauling of demolition debris. Inherent in this factor are specific assumptions concerning:

- The average speed and weight of the trucks.
- The number of wheels per truck.

- The number of days per year with measurable rainfall.
- The distance of truck travel.

The computer program, on the other hand, provides the user with the opportunity to input site-specific values of these parameters in support of a site-specific emission factor for this source. Hard copy outputs from the program describe what methods in the reference document were used to estimate the emissions so that any differences from the example calculations in the reference document can be understood.

In addition, the wind erosion estimation methods described in the reference document require knowledge of the joint frequency distribution of both (a) high wind events and (b) disturbances of the erodible surface material. In general, because it is very difficult to predict the occurrence of these events, the approach taken in Section 6.0 of this manual employs several conservative assumptions. Consequently, the wind erosion estimates produced by the computer program may be greater than those calculated using the reference document. This is discussed in greater detail in Section 6.0.

SECTION 2.0

REQUIRED EQUIPMENT

The equipment necessary to operate this program is:

- An IBM-compatible computer equipped with either a hard drive and a 5 1/4-in single disk drive or dual disk drives with one disk drive being a 5 1/4-in disk drive.
- An MS-DOS operating system installed on the computer.
- Either a wide-carriage (132-character) printer or a printer capable of printing text in a condensed mode. (NOTE: Because user copies of the output will be contained in a text file stored on diskettes, the printer need not be in the same physical location as the computer.)

Another item that may prove useful (but is not necessary) is either a text editor (such as "Program Editor," supplied by Satellite Software) or a word processing program (such as WordPerfect) capable of manipulating ASCII or DOS text files. These programs may be used to modify reports produced by this program.

The user should be aware of the type of disk drive(s) (high- or low-density) that is available on the computer on which the program is to be used. The user should take the necessary precautions to ensure that the correct type of diskette is used when either installing the program onto another diskette or saving data onto a diskette. The user should be aware of the following information:

- Low-Density Disk Drive

  A low-density disk drive can only use low-density diskettes (also known as double-sided/double-density diskettes). The low-density disk drive can neither input nor retrieve data from a high-density diskette.

- High-Density Disk Drive

  A high-density disk drive can retrieve data from a low-density diskette. However, there is the potential for error if a high-density disk drive is used to input data onto a low-density diskette.

SECTION 3.0

PROGRAM INSTALLATION

The computer package consists of two 5 1/4-in diskettes, one marked "Mechanical" and the other "Wind Erosion." Each diskette is a double-sided/double-density diskette (low-density diskette) which contains a DOS batch file to install the necessary programs onto the computer's hard drive or another diskette. The diskettes supplied with this package can be reused to install the programs onto different computers. Thus the original diskettes supplied should be kept in a safe place so that the programs can be reinstalled if necessary.

The computer used in both of the following installation examples is configured in the following manner. Please note that computers can be configured differently.

- Drive "A": 5 1/4-in drive designed for high-density diskettes
- Drive "B": 5 1/4-in drive designed for low-density diskettes
- Drive "C": hard drive

Throughout both of these examples, if the "Mechanical" or "Wind Erosion" program diskette is inserted in the "B" drive instead of the "A" drive, the "A's" in the following commands would be "B's".

In order to install or operate this program, the computer must be in DOS. The "C" drive is the initial default drive for the computer used in the following examples. Therefore, the initial screen will have the following prompt:

```
C:\>
```

3.1 PROGRAM INSTALLATION TO A HARD DRIVE

The following instructions will assist the user to install the "Mechanical" and "Wind Erosion" programs onto a hard drive. The "Mechanical" and Wind Erosion" programs are placed in directories named "MECH@x@y" and "WIND@x@y", respectively. In the unlikely event that a hard drive already contains directories with these names, the contents of the existing directories should be copied to new directories.

In addition to the two program diskettes, the user will need two clean (contains no files) formatted diskettes. These diskettes will be referred to as the "Data" diskettes throughout these instructions. One diskette will be the "Data" diskette for the "Mechanical" program, and the other will be the "Data" diskette for the "Wind Erosion" program.

Because of the way the program is written, the "Data" diskette must be used in the same disk drive as the one used to install the program. Therefore, for a computer configured as the one used in this example, the "Data" diskette must be a high-density diskette if the program was installed from disk drive "A", and a low-density diskette if drive "B" was used to install the program.

1. Insert either the "Mechanical" or the "Wind Erosion" diskette into a disk drive (drive "A" for this example), and make that disk drive the default drive by entering "A:" at the prompt. For this example, assume that the "Mechanical" program is being installed.

2. Enter the command "PUTMEIN" at the prompt. For this example:

   A:\>PUTMEIN

3. The first screen will inform the user as to which program is being installed, either the "Mechanical" or the "Wind Erosion." In this example, the screen will display a message indicating that the mechanical resuspension programs are to be installed.

   At the bottom of the screen appears,

   Press ENTER when you are ready to continue.

4. Upon pressing ENTER, the user will be asked to provide the following information:

   Enter the disk drive that the MECHANICAL diskette is in (e.g., "A" or "C").

   Enter the destination drive to which the program is to be installed.

   NOTE: The response to these two questions must be different. For this example, the "Mechanical" diskette is in the "A" drive and the program will be installed in the "C" drive.

5. The next screen will ask the user the following question:

   Is the destination drive a hard drive (y/n)?

   For this example, enter "y".

6. After entering "y", the next screen will ask the user to indicate which drive (and directory, if any) contained the DOS PRINT.COM file. The screen will appear as follows:

   Enter the drive (and directory, if any) that contains the DOS PRINT.COM file. The information should be entered as follows: DRIVE:\DIRECTORY (for example, C:\DOS).

For this example, because the PRINT.COM file is in the root directory of the hard drive, enter "C:\".

7. The next screen will request the user to enter the command "INSTL" to begin copying the program onto the hard drive. In this example, the screen will read:

   Enter the command "INSTL" to begin installation of the program.

   All program files will be copied into C:\MECH@x@y (for the "Mechanical" program or C:\WIND@x@y for the "Wind Erosion" program).

8. The final screen for the installation portion of the program will be:

   Remove the MECHANICAL diskette and insert a formatted diskette into drive "A". The diskette in drive "A" will become the "Data" diskette.

   Enter the following commands separately:

   (1) A:
   (2) cd\
   (3) copy C:\MECH@x@y\atb@t*.* A:*.*
   (4) MENU

   NOTE: When installing the "Wind Erosion" program, step (3) will appear as follows: copy C:\WIND@x@y\atb@t*.* A:*.*

   NOTE: For this example, the diskette inserted into drive "A" will be a high-density diskette since "A" is a high-density drive. This diskette becomes the "Data" diskette which will contain the input and output data and should be dedicated solely for use with this program.

By following the above instructions, the program has been installed on the hard drive. The main menu screen will be displayed after entering the command "MENU".

3.2 INITIATING THE PROGRAM AFTER INSTALLATION

Once the program has been installed on the hard drive, the user can access it by complying with the following instructions:

1. The computer must be in the DOS program.

2. Insert the "Data" diskette into the proper disk drive (for this example, drive "A"), and make that disk drive the default drive.

3. Enter the command "MENU".

3.3 PROGRAM INSTALLATION TO A DISKETTE

The following instructions will assist the user to install the "Mechanical" and "Wind Erosion" programs onto diskettes. For this example, assume that the "Mechanical" program is being installed.

In addition to the two program diskettes, the user will need four clean (contains no files) formatted diskettes. Two of the diskettes will be used to store data. These diskettes will be referred to as the "Data" diskettes for either "Mechanical" or "Wind Erosion" programs throughout these instructions. The DOS file PRINT.COM must be copied onto the two "Data" diskettes. Users unfamiliar with this type of operation should consult the persons responsible for their computer installation.

The "Mechanical" and "Wind Erosion" programs will be installed on the other two diskettes, one diskette for each program. These diskettes will be referred to as the "Program" diskettes.

1. Insert the "Mechanical" or "Wind Erosion" diskette into a disk drive (drive "A" for this example), and make that disk drive the default drive by entering "A:" at the prompt. (Since the computer used in this example has both a high- and low-density disk drive, the program diskette should be inserted in the high-density disk drive. See Section 2.0 for a discussion of high- and low-density disk drives.) In this example, assume that the "Mechanical" programs are to be installed.

2. Insert a clean (contains no files) formatted diskette into drive "B". This diskette should be formatted without the DOS SYSTEM files. If the DOS SYSTEM files are formatted onto this diskette, there will be insufficient space remaining for the program. (In this example, the "Mechanical" program is copied onto a low-density diskette since the "B" drive is a low-density disk drive.)

3. Enter the command "PUTMEIN" at the prompt. For example:

   A:\>PUTMEIN

4. The first screen will inform the user which program is being installed, either the "Mechanical" or the "Wind Erosion." In this example, the screen will inform the user that the mechanical resuspension portion of the package is to be installed.

   At the bottom of the screen appears,

   Press ENTER when you are ready to continue.

5. Upon pressing ENTER, the user will be asked to provide the following information:

   Enter the disk drive that the MECHANICAL diskette is in (e.g., "A").

   Enter the destination drive to which the program is to be installed.

   NOTE: The response to these two questions must be different. For this example, the "Mechanical" diskette is in the "A" drive, and the program will be installed onto the diskette in the "B" drive.

6. The next screen will ask the user the following question:

   Is the destination drive a hard drive (y/n)?

   For this example enter "n".

7. The next screen will request the user to enter the command "INSTL" to begin copying the program onto the disk drive. In this example, the screen will read:

   Enter the command "INSTL" to begin installation of the program. All program files will be copied into B:\MECH@x@y (for the "Mechanical" program and B:\WIND@x@Y for the "Wind Erosion" program).

8. The final screen for the installation portion of the program will be:

   Remove the MECHANICAL diskette and insert a formatted diskette into drive A. The diskette in drive A will become the "Data" diskette and should contain the DOS PRINT.COM file.

   Enter the following commands separately:

   (1) A:
   (2) cd\
   (3) copy B:\MECH@x@y\atb@t*.* A:*.*
   (4) MENU

   NOTE: When installing the "Wind Erosion" program, step (3) will appear as follows: copy B:\WIND@x@Y\atb@t*.* A:*.*

   NOTE: If "A" is a high-density drive, the user is advised to use a high-density diskette for the "Data" diskette.

3.4 INITIATING THE PROGRAM INSTALLED ON A DISKETTE

Once the program has been installed onto a diskette, the user can access the program by complying with the following instructions:

1. The computer must be in the DOS program.

2. Insert the "Data" diskette into the proper disk drive (for this example, drive "A"), and make that disk drive the default drive.

3. Insert the "Program" diskette into the proper disk drive (for this example, drive "B").

4. Enter the command "MENU".

3.5 INITIALIZING A NEW "DATA" DISKETTE

When the storage capacity of the "Data" diskette becomes limited, it is recommended that a new "Data" diskette be initialized. In order to initialize a new "Data" diskette, the following steps must be complied with.

1. The computer must be in the DOS program.

2. If the program was installed on a hard disk drive:

   - Insert a newly formatted diskette into a disk drive (for this example, use drive "A:), and make that disk drive the default drive by entering "A:" at the prompt. (Use the proper density [high or low] diskette.)

   - Enter the following commands separately:

     (1) cd\
     (2) copy C:\WXYZ@x@y\atb@t*.* A:*.*

   NOTE: "WXYZ" is "WIND" for the wind erosion programs and "MECH" for the mechanical programs.

3. If the program was installed on a diskette:

   - Insert a newly formatted diskette into a disk drive (for this example, use drive "A"), and make that disk drive the default drive by entering "A:" at the prompt. (Use the proper density [high or low] diskette, and copy the DOS file PRINT.COM onto the diskette.)

   - Insert the "Program" diskette into the remaining disk drive (for this example, use drive "B").

- Enter the following commands separately:

  (1) cd\
  (2) copy B:\WXYZ@x@y\atb@t*.* A:*.*

NOTE: "WXYZ" is "WIND" for the wind erosion programs and "MECH" for the mechanical programs.

NOTE: Different "Data" diskettes must be used for both the "Mechanical" and "Wind Erosion" program.

SECTION 4.0

OVERVIEW OF THE COMPUTER MODEL PACKAGE

The computer programs in this package are based on the material presented in the document, *Control of Open Fugitive Dust Sources*, EPA-450/3-88-008. This document is referred to as the "reference document" throughout this user's manual and throughout the programs. It is recommended that the user have the reference document handy while he/she is first using the computer package.

The basic operation of the programs relies on user-generated data files. During data entry routines, user-generated files are automatically named with the following format:

filename.EXT

where "filename" is a five- to eight-character name used to identify the file, and "EXT" is a two- or three-character extension used to identify the type of file. The filename is based on certain information requested of the user during the data entry process. The extension used to identify the type of information contained in the file follows certain conventions.

For "mechanical" sources, "EXT" consists of two letters, with the first being "U" for unpaved roads, "P" for paved roads, "M" for materials handling, "A" for agricultural tilling, or "C" for construction/demolition activities. The second letter is either "E" for English units (e.g., mile, feet, etc.) or "M" for metric units (e.g., meters, kilometers). Thus a file with an extension of "ME" indicates that the file contains data input for materials handling operations and that English units were chosen to characterize the sources.

For wind erosion sources, the possible extensions are either (a) "MET," denoting a "fastest mile of wind" data file, or (b) for data ENTRY/VIEW files, a two- or three-letter extension of the form:

XYZ

where: X is either E or M, for English or metric units, respectively

Y is either F or P, for flat area or pile, respectively

Z is a blank for flat areas and either C or O, for conical or oval piles, respectively

The computer programs will always present a list of available data files meeting the necessary specifications (i.e., the proper EXT) when the user is asked to provide a filename. (NOTE: Always supply the full name including the extension when asked to supply a filename.)

Calculated emission rates for all mechanical sources are given in terms of grams per second (g/s). This approach has been taken because emission inventory activities usually include some dispersion modeling which, in turn, requires emission rates to be in g/s. User copies of the output contain the multiplicative factors needed to convert g/s to Mg/yr, ton/yr, and lb/d. The remaining portions of this user's manual discuss the use of the computer programs to calculate emission rates and develop control plans for open dust sources.

SECTION 5.0

THE "MECHANICAL" PROGRAMS

This section of the manual describes the use of the programs contained on the diskette marked "Mechanical." These programs allow the user to obtain emission estimates for the following open dust source categories:

Source category	Chapter in reference document
Unpaved roads	3
Paved roads	2
Materials handling	4
Agricultural tilling	7
Construction/demolition	5

5.1 MAIN MENU

Once the programs have been installed (following the installation procedures given in Section 3.0), enter MENU. After MENU has been typed, the screen will clear, and a menu or "list" of options will appear. To choose any one of the options listed, simply type the capitalized part of the option word (in this case, the first letter). The screen will clear once again, and new instructions and/or information will appear. The available options include the following:

MENU--choosing this option now or later will return the user to this screen.

ENTRY--choosing this option allows the user to enter data for any of five different source categories: unpaved roads, paved roads, materials handling, construction/demolition, and agricultural tilling. This option is discussed in more detail on the following pages.

VIEW--choosing this option allows the user to review and, if desired, modify data files already created under the ENTRY option. In addition, this option allows the user to calculate emission rates and, where appropriate, study the effects of various control strategies on the emission rates. This option is also discussed in greater detail on the following pages.

REPORT--choosing this option allows the user to print copies of the data and the emission rates resulting from them. (NOTE: These copies are contained in a file named "PM10.D@T," which should be deleted with the command

DEL PM10.D@T

after the printer has stopped.)

5.2 THE ENTRY OPTION (FROM THE MAIN MENU)

Once the ENTRY option is chosen, the user will be asked to choose from five source categories: unpaved roads, paved roads, materials handling, construction/demolition, or agricultural tilling. Regardless of the source picked, several features will be similar. First, the user will be asked to indicate whether English or metric units are to be used. Then, the screen will clear and information concerning data requirements for the particular source will appear. Those data items which need to be entered only once (e.g., facility name, days of rainfall, etc.) are discussed, as well as those data items for which default values might be desired. Default values may be used in the absence of site-specific values; however, the use of site-specific data is STRONGLY RECOMMENDED.

The "default value" may also be used to simplify data entry for a parameter, such as vehicle speed, which might have the same value for many of the data records to be entered. For example, if the user is inputting 30 data records for unpaved roads and if 20 involve a vehicle speed of 25 mph, then the user can make the default value of vehicle speed 25 mph so that only those values NOT equal to 25 mph would have to be entered.

Please note that for those data items which have a default value, some value MUST be entered even if no default value is desired. If the suggested default value is acceptable, simply hit the "enter" key. If some other value is desired, type that value into the field. Remember that, while the default values must be entered, they do not HAVE to be used.

The data entry procedures for each of the source categories available under the ENTRY option will now be discussed. (NOTE: The double quote ["] should NOT be used in any response to denote, say, "inches" or "ditto.")

5.2.1 Unpaved Roads

Choosing this source under the ENTRY option of the MAIN MENU will allow the user to input data values which will be used to calculate emission rates for unpaved roads. First, the user will be asked to indicate whether English or metric units are to be used. Then, the number of days with significant rain is requested. The screen clears, and the number of working days per year is asked for. The screen clears again, and the user will encounter a screen showing highlighted fields for:

Facility name
Road segment ID

Vehicle passes
Length of road segment
Average vehicle speed (D)
Number of wheels (D)
Average weight (D)
Silt content (D)

A (D) following a data item indicates that a default value for that particular item is suggested (and required).

When this screen first appears, the user will be asked to supply the facility name and choose default values for speed, number of wheels, weight, and silt content. (NOTE: Suggested values appear directly to the right on the screen.) If the suggested value is acceptable, simply hit the "enter" key. Otherwise, type in the desired value. But remember that some value must be entered even if no default value is desired. Also, while the default values must be entered, they do not have to be used.

When these five fields have been entered, the program will ask if the entered data are OK. If the user presses "Y", a new screen will appear and the data for the first road segment (record No. 1) can be entered. If the answer is "N", then the user will be able to change the incorrect data.

When record No. 1, or any record after this one, is being entered, the user MUST supply a road segment ID (e.g., A1, segment1, etc.). Please note that since a "q" or "Q" is entered to exit the data entry procedure, the road segment ID should not be a single "q" or "Q". (NOTE: Segment IDs such as "q1" or "QQ" ARE acceptable.) The user then enters the number of passes and the length of the road segment. When the user reaches any of the data items which have a default value associated with them, the actual value should be entered unless the default value is desired. Should the user want the default value, pressing the "enter" key will automatically cause the default value to be used. (NOTE: An asterisk is appended to denote that the default was selected.)

If, during the data entry process, the HELP feature is desired, enter a question mark "?" instead of a numerical value, and the HELP feature will become available.

When the user quits the data entry routine (by entering a "q" or "Q" in the road segment ID field), the program will store the entered data in a file and inform the user of the file name.

5.2.2 Paved Roads

Choosing this source under the ENTRY option of the MAIN MENU will allow the user to input data values which will be used to calculate emission rates for paved roads. First, the user will be asked to indicate whether English or metric units are to be used. The screen clears, and the number of working

days per year is asked for. The screen clears again, and the user will encounter a screen showing highlighted fields for:

Facility name
Road segment ID
Vehicle passes
Length of road segment
Average weight (D)
Average silt load on road surface (D)

A (D) following a data item indicates that a default value for that particular item is suggested (and required).

When this screen first appears, the user will be asked to supply the facility name and choose default values for weight and silt loading. (NOTE: Suggested values appear directly to the right on the screen.)

If the suggested value is acceptable, simply hit the "enter" key. Otherwise, type in the desired value. Again, remember that while the default values must be entered, they do not have to be used. (NOTE: Silt loading values are always entered in the units of g/m^2, whether English or metric units are selected. This convention is used because the usual method of determining the weight of vacuum bag samples is with a metric triple beam balance.)

When these three fields have been entered, the program will ask if the entered data are OK. If the user presses "Y", a new screen will appear and the data for the first road segment (record No. 1) can be entered. If the answer is "N", then the user will be able to change the incorrect data.

When record No. 1, or any record after this one, is being entered, the user MUST supply a road segment ID (e.g., A1, segment1, etc.). Please note that since a "q" or "Q" is entered to exit the data entry procedure, the road segment ID should not be a single "q" or "Q". (NOTE: Segment IDs such as "q1" or "QQ" ARE acceptable.) The user then enters the number of passes and the length of the road segment. When the user reaches any of the data items which have a default value associated with them, the actual value should be entered unless the default value is desired. Should the user want the default value, pressing the "enter" key will automatically cause the default value to be used. (NOTE: An asterisk is appended to default values.)

If at any time during the data entry process, the HELP feature is desired, enter a question mark "?" instead of a numerical value, and the HELP feature will become available.

When the user quits the data entry routine (by entering a "q" or "Q" in the road segment ID field), the program will store the entered data in a file and inform the user of the file name.

5.2.3 Materials Handling

Choosing this source under the ENTRY option of the MAIN MENU will allow the user to input data values which will be used to calculate emission rates for materials handling operations. First, the user will be asked to indicate whether English or metric units are to be used. Then the mean annual wind speed is requested. The screen clears, and the number of working days per year is asked for. The screen clears again, and the user will encounter a screen showing highlighted fields for:

Facility name
Material ID
Amount handled per day
Moisture content (D)
Silt content (D)

A (D) following a data item indicates that a default value for that particular item is suggested (and required).

When this screen first appears, the user will be asked to supply the facility name and choose default values for moisture content and silt content. (NOTE: Suggested values appear directly to the right on the screen.) If the suggested value is acceptable, simply hit the "enter" key. Otherwise, type in the desired value. But remember that some value must be entered even if no default value is desired.

When these three fields have been entered, the program will ask if the entered data are OK. If the user presses "Y", a new screen will appear and the data for the first material (record No. 1) can be entered. If the answer is "N", then the user will be able to change the incorrect data.

When record No. 1, or any record after this one, is being entered, the user MUST supply a material ID (e.g., A1, segment1, etc.). Please note that since a "q" or "Q" is entered to exit the data entry procedure, the material ID should not be a single "q" or "Q". (NOTE: IDs such as "q1" or "QQ" ARE acceptable.) The user then enters the amount of material handled. When the user reaches any of the data items which have a default value associated with them, the actual value should be entered unless the default value is desired. Should the user want the default value, pressing the "enter" key will automatically cause the default value to be used. (NOTE: An asterisk is appended to default values to denote that the default was selected.)

If at any time during the data entry process, the HELP feature is desired, enter a question mark "?" instead of a numerical value, and the HELP feature will become available.

When the user quits the data entry routine (by entering a "q" or "Q" in the material ID field), the program will store the entered data in a file and inform the user of the file name.

5.2.4 Agricultural Tilling

Choosing this source under the ENTRY option of the MAIN MENU will allow the user to input data values which will be used to calculate emission rates for agricultural tilling operations. First, the user will be asked to indicate whether English or metric units are to be used. The screen clears, and the user will encounter a screen showing highlighted fields for:

Agricultural area
Source ID
Area tilled
Number of days worked per year
Silt content of field material (D)

A (D) following a data item indicates that a default value for that particular item is suggested (and required).

When this screen first appears, the user will be asked to supply the agricultural area name and choose a default value for the silt content. (NOTE: A suggested value appears directly to the right on the screen.) If the suggested value is acceptable, simply hit the "enter" key. Otherwise, type in the desired value. But remember that some value must be entered even if no default value is desired. Remember that while the default value must be entered, it does not have to be used.

When these three fields have been entered, the program will ask if the entered data are OK. If the user presses "Y", a new screen will appear and the data for the first source (record No. 1) can be entered. If the answer is "N", then the user will be able to change the incorrect data.

When record No. 1, or any record after this one, is being entered, the user MUST supply a source ID (e.g., A1, segment1, etc.). Please note that since a "q" or "Q" is entered to exit the data entry procedure, the source ID should not be a single "q" or "Q". (NOTE: Segment IDs such as "q1" or "QQ" ARE acceptable.) The user then enters the area tilled and the number of days that this area has been worked. When the user reaches the data field for silt content, the actual value should be entered unless the default value is desired. Should the user want the default value, pressing the "enter" key will automatically cause the default value to be used. (NOTE: An asterisk is appended to denote that the default was selected.)

If at any time during the data entry process, the HELP feature is desired, enter a question mark "?" instead of a numerical value, and the HELP feature will become available.

When the user quits the data entry routine (by entering a "q" or "Q" in the source ID field), the program will store the entered data in a file and inform the user of the file name.

5.2.5 Construction/Demolition

Choosing this source under the ENTRY option of the MAIN MENU will allow the user to input data values which will be used to calculate emission rates for construction/demolition operations. First, the user will be asked to indicate whether English or metric units are to be used. The screen clears, and several screens appear requesting specific information.

The construction/demolition input format is slightly different from the first four source categories. For the first four categories, repetitive data entry (e.g., several road segments in an industrial plant or several different materials handling) is usually necessary. For construction activities, however, emission estimates are obtained from user responses to a series of individual questions. The first set of information requested (each on a separate screen) is:

Name of construction site
Average number of rain days (D)
Average wind speed (D)
Distance from the public access road to the site
Silt content of site surface (D)
Moisture content of surface (D)

A (D) following a data item in this section of the manual indicates that a default value for that particular item is available. After these data items have been entered, the user is asked if there are data for a demolition phase. If the reply is yes, then, on separate screens, the user is asked to supply data for:

Floor space
Number of weeks for this phase
Number of workdays per week (D)
Haul truck net weight (D)
Haul truck average speed (D)
Number of wheels (D)

After these data items have been entered (or if the demolition phase has been skipped), the user is asked if there are data for site preparation. If the reply is yes, then, on separate screens, the user is asked to supply data for:

Number of weeks for preparation
Workdays per week (D)
Number of bulldozer h/d
Number of scraper h/d
Amount of material hauled per day
Average scraper speed (D)
Average haul truck speed (D)
Average weight of haul truck (D)

After these data items have been entered (or if the site preparation phase has been skipped), the user is asked if there are data for new construction activities. If the reply is yes, then, on separate screens, the user is asked to supply data for:

Area of active construction
Number of weeks for construction
Number of workdays per week (D)
Number of work hours per day (D)
Number of vehicles entering the site per day (D)
Vehicle passes/day on adjacent paved streets (D)

When the user encounters any of the data items which have a default value associated with them, the actual value should be entered unless the default value is desired. Should the user want the default value, pressing the "enter" key will automatically cause the default value to be used. (NOTE: An asterisk is appended to default values to denote that the default was selected.)

If at any time during the data entry process for construction/demolition, the HELP feature is desired, enter a question mark "?" instead of a numerical value, and the HELP feature will become available.

When all of the data have been entered, the program will store the entered data in a file and inform the user of the file name.

5.3 THE VIEW OPTION FROM THE MAIN MENU

The VIEW option allows the user to review, modify if necessary, and process any data which have been entered using the ENTRY option previously discussed. Since it is possible that data for many different facilities and/or source categories have already been entered, it is necessary for the user to enter the name of the file that contains the data to be reviewed and processed. A list of data files stored by the user is listed at the top of the first screen which appears when this option is chosen. The user should choose from this list. Next, if the source category corresponding to the data is either unpaved roads, paved roads, or materials handling, the user will be asked if controls are to be considered. If the answer is no (meaning that NO controls are to be factored into the calculations), then for any source category, the data are presented in a spread sheet format. The user need only move about the spread sheet and make changes where desired. The worst-case and annual emission rates for an individual source will be automatically updated when any data values affecting that source are changed. The user will find ample on-screen instructions for how to move about the spread sheet, how to make changes in the data, and how to update the complete spread sheet.

When the user exits the spread sheet, the program will ask whether the changes should be saved. Please note that:

- If changes are to be saved, the previous data file will be overwritten (i.e., previous data are lost and only the data as they now appear in the spread sheet will be saved).

- Changes may only be saved if the user chooses not to consider controls. Thus, when verifying the input data or adding data to an existing file, the user should elect not to consider controls. Once the changes have been saved, the user may immediately reVIEW the file and consider controls.

If the user wishes to consider how controls might affect the emission rates, then several data values will be requested before the spread sheet is presented. The programs also contain information necessary to estimate the costs associated with the control program. These data items related to emission controls are explained in some detail on the following pages.

5.3.1 Unpaved Roads

5.3.1.1 Control Options--

The user is first asked to choose between two possible controls: watering or chemical suppressants. If the user chooses watering, then the following data are requested:

Mean annual Class A Pan evaporation
% Vehicle travel during daylight hours
Average road width
Average watering rate
Number of daylight working hours

If the user chooses chemical suppressants, then the following data are requested:

Weeks per year chemical is applied ("dust control season")
Average volume of chemical (not solution) applied each time
Average road width
Weeks between applications

Once the control data are entered, all the data will be presented in a spread sheet format. The spread sheet will look the same as the one when no controls were used; however, in this case, the user will find the total worst-case and annual emission rates calculated for both controlled and uncontrolled sources. In addition, for each source, the individual worst-case and annual controlled emission rate is presented.

User copies of the spread sheets contain information upon which control costs may be estimated. For watering, the amount of water needed is presented in base units of 1,000 gal/h or 1,000 L/h. Because one truck can be assumed to apply 4,250 gal or 16,000 L every hour, the user can determine how many water trucks are required (at an estimated cost of $50,000 per truck). Chemical suppressant needs are expressed in base units of 1,000 gal or 1,000 L/yr. The spread sheets also present an estimated unit cost for the chemicals of $1.50/gal or $0.40/L, together with a multiplicative factor for delivery and application.

Remember that if controls are considered, the changes that the user makes to the data in the spread sheet format CANNOT be saved. Consequently, if

changes or additions are found to be necessary, the user should (1) exit the VIEW session, (2) reenter choosing not to consider controls, (3) make and save the changes to the file, and (4) reenter again using the corrected file and whatever control options are desired.

5.3.1.2 Emission Estimates--

Emission estimates are based on Equation (3-1) of the reference document. Worst-case emissions are based on a 24-h averaging period and a dry (i.e., p = 0 in Equation [3-1]) working day; annual emissions are based on a 365-day averaging period, taking into account the number of working days and days with rain as supplied by the user. Control efficiency values for chemical suppressants are based on Figure 3-4 of the reference document and information requested from the user, and the same value is applied to both worst-case and annual conditions. Control efficiency values for watering are based on Equation (3-2) of the reference document, together with information requested of the user. Different values of "P"--the hourly daytime evaporation rate--in the equation are used to calculate separate worst-case and annual controlled emission rates. Note that the efficiency value given in the efficiency spread sheet is the annual value.

5.3.2 Paved Roads

5.3.2.1 Control Options--

The user is asked to either consider uncontrolled emissions or to choose from three possible controls:

Flushing
Vacuum sweeping
Flushing with broom sweeping

For any of these control options, the user is asked to supply the number of times per week that the control is used.

Once the control data have been entered, all the data are presented in a spread sheet format with worst-case and annual emission rates calculated for both controlled and uncontrolled sources.

Costs associated with the paved road controls are expressed with base units of miles or kilometers to be treated per week. The user copies of the spread sheets contain this information, together with an annualized estimated cost for the control device and the distance a device can treat per unit time.

Please note that, as in the case for unpaved roads, changes made to the data in the spread sheet format CANNOT be saved if controls are considered.

5.3.2.2 Emission Estimates--

Emission estimates are based on the scheme presented as Table 2-7 of the reference document. Worst-case emissions are based on a 24-h averaging period and a "working day" as defined in the program; annual emissions are based on a 365-day averaging period, taking into account the number of working days supplied by the user. Control efficiency values for vacuum sweeping are based on information presented in Section 2.3.2.2 of the reference document and assume

a constant instantaneous control of 34% over the first two days and zero control thereafter. Control efficiency values for water flushing with and without broom sweeping are based on Table 2-4 of the reference document together with information supplied by the user. The number of vehicle passes following application (which is needed in the referenced table) is obtained by multiplying the number of daily vehicle passes by seven and then dividing by the number of times per week that the control is applied. For all controls, the instantaneous control efficiency is converted to an average control efficiency using the procedures described in Appendix A of the reference document. The resulting expressions are given as Table 5-1. The same average control value is then applied to both worst-case and annual conditions.

TABLE 5-1. ESTIMATION METHODS FOR AVERAGE EFFICIENCY VALUES FOR PAVED ROAD CONTROLS[a]

Control	Average efficiency, C (%)[b]	Comments
Vacuum sweeping	C = 34, D ≤ 2 68/D, D > 2	340 m^3/min (12,000 cfm) blower tested
Waster flushing	C = 68-0.116 V, V ≤ 299 10,300/V, V > 299	Water applied at 2.2 L/m^2 (0.48 gal/yd^2)
Water flushing followed by broom sweeping	C = 96-0.132 V, V ≤ 365 17,500/V, V > 365	Water applied at 2.2 L/m^2 (0.48 gal/yd^2)

[a]Based on PM-15 field emission measurements as given in the reference document. PM-10 efficiency may be assumed equal to that for PM-15.

[b]In the expressions, D and V represent the number of days or vehicle passes, respectively, since application.

5.3.3 Materials Handling

5.3.3.1 Control Options--

The user is first asked to either consider uncontrolled emissions or to choose one of two possible controls:

Wind speed reduction
Moisture addition

If the user chooses wind speed reduction, the only data value requested is the percent reduction assumed.

If the user chooses moisture addition, the average moisture added is requested.

Once the control data have been entered, all the data are presented in a spread sheet format with worst-case and annual emission rates calculated for both controlled and uncontrolled sources.

When applicable, the user copy of the spreadsheet contains information on the estimated cost for moisture addition. The cost for windbreaks is very site-specific and user copies contain that warning.

Please note that if controls are considered, the changes made to the data in the spread sheet format CANNOT be saved.

5.3.3.2 Emission Estimates--

Emission estimates are based on Equation (4-1) of the reference document. Worst-case emissions are based on a 24-h averaging period and a working day; annual emissions are based on a 365-day averaging period, taking into account the number of working days as supplied by the user. Control efficiency values for wind speed reductions are based on direct application of Equation (4-1) of the reference manual using the reduced wind speed. Control efficiency values for moisture addition are also based on Equation (4-1), but additional computations are required to convert the water added to a new moisture. For example, in English units, the moisture content entered by the user is multiplied by 2,000 lb to determine the "old" water mass per ton. To this is added the "new" water mass which equals 8.34 lb for every gallon of water added to 1 ton of material. The new moisture content is then estimated using the total water mass (per ton) and an assumed dry material weight of 1 ton.

5.3.4 Agricultural Tilling

The VIEW option for this source category is essentially identical to the previous three categories with one exception. Only uncontrolled emissions are considered because all available control techniques listed in EPA-450/3-88-008 are single-valued and crop-specific (cf. Table 7-5 of the reference document). A HELP file is available to remind the user of this table.

Emission estimates are based on the equation given in Section 7.1.1 of the reference document. Worst-case emissions are based on a day that tilling actually takes place and a 24-h averaging period; annual emissions are based on a 365-day averaging period, taking into account the number of days that tilling occurs (as supplied by the user).

5.3.5 Construction/Demolition

As in the case of data entry, the VIEW option for construction/demolition activities is somewhat different from the four preceding source categories:

1. Only uncontrolled emissions are considered. Because most of the emission sources for this category are identical to other categories (e.g., materials handling, paved and unpaved traffic), the estimates

given represent a "first-cut" based on the information available to the user.

2. Improved emission estimates and control plans may be developed by breaking the construction process down into the "unit operations" of materials handling, etc., and using the other portions of the computer package.

3. Although the same spread sheet format is used to display the input data and calculated emission rates, automatic updating is not performed. Whenever changes are made, a reminder to update the calculations appears at the top of the screen.

Calculated emission rates for individual sources within each construction phase are presented in spread sheet cells A42 through A56. In addition, an average emission rate, weighted by the number of weeks in each phase (i.e., demolition, site preparation, construction) considered by the user, is presented.

Emission estimates for construction and demolition are based on a variety of models presented in the reference document. Emissions from building demolition, loading of the debris, mud/dirt carryout, and scaper and dozer operations are based on Sections 5.1.2.1, 5.1.2.2, 5.1.3, 5.1.1, and 5.1.2.5, respectively, of that document. Note also that:

- The dozer expression (Equation [5-3]) used in this computer package incorporates the new PM-10 to PM-15 ratio presented in Supplement B of AP-42.

- On the basis of conversations with the author of Section 5 of the reference document, the "earthmoving" emission value for scrapers is considered more representative of average conditions than is the "topsoil removal" value.

The emission estimates for truck travel during both demolition and site preparation phases are based on application of the unpaved road emission factor model (Equation [3-1] of the reference document) together with information requested of the user (e.g., surface silt content, distance from site to access point, number of wheels, etc.). In addition, it is assumed in the package that (1) half of the truck trips are loaded and the other half unloaded, and (2) the tare weight of a truck is equal to its net weight. This approach was employed rather than the single-valued emission factors given in Sections 5.1.1 and 5.1.2.4 to provide the user with site-specific estimates.

The emission estimate for actual construction is based on the emission factor of 4.0 kg/ha/work h. This value is a reexamined version of the factor presented in Section 11.2.4 of AP-42, with the revisions (a) reflecting the PM-10 mass fraction, and (b) basing emission estimates on working hours rather than months.

SECTION 6.0

THE "WIND EROSION" PROGRAMS

This section describes the use of the programs contained on the "Wind Erosion" diskette. These programs are based on information presented in Sections 4 and 6 of the reference document.

6.1 MAIN MENU

Once the programs have been installed (following the installation procedures described in Section 3.0), enter MENU. After MENU has been typed, the screen will clear, and a menu or "list" of options will appear. This list is referred to as the MAIN MENU.

To choose any one of the options listed, simply type the capitalized part of the option word (in this case, the first letter). The screen will clear once again, and new instructions and/or information will appear. The available options include the following:

MENU--choosing this option now or later will return the user to this screen.

WIND--choosing this option allows the user to enter fastest mile of wind data which will then be used to calculate emission rates under the VIEW option. This option is discussed in more detail on the following pages.

ENTRY--choosing this option allows the user to enter data for any wind erosion source category. This option is also discussed in greater detail on the following pages.

VIEW--choosing this option allows the user to review and, if desired, modify data files already created under the ENTRY option. In addition, this option allows the user to calculate emission rates and, where appropriate, study the effects of various control strategies on the emission rates. This option is also discussed in greater detail on the following pages.

REPORT--choosing this option allows the user to get hard copies of the data and the emission rates resulting from them.

The WIND, ENTRY, and VIEW options will now be discussed in more detail.

6.2 THE WIND OPTION FROM THE MAIN MENU

The purpose of this option is to provide the site-specific fastest mile of wind data files needed to estimate erosion emissions. For more information on the term "fastest mile of wind," available sources of information, and why this type of information is necessary, please consult the reference document (EPA-450/3-88-008). A HELP file is also available during execution of the program.

When this option is chosen, the screen will clear and introductory information about the data requirements is shown. If new data are to be entered, the name of the weather station, record year, and the anemometer height (in meters) are requested. Once these data are entered, the user will move directly into a spread sheet where the fastest mile of wind data is to be entered. Existing fastest-mile files may also be reviewed and edited.

Daily fastest mile values taken from local climatological data summaries (LCDs--data can be obtained from the National Climatic Center in Asheville, North Carolina) are entered under the columns Sun through Sat. (The numbers corresponding to Month and Week are provided to allow the user to quickly locate an entry for verification.) Once the data have been entered and any changes made, the user hits the slash ("/") key to signal the end. The program will show, at the bottom of the screen, the filename under which the data are being stored. This filename should be noted for future reference and used under the VIEW option discussed below. (NOTE: An example fastest mile of wind data file--based on the example used in Sections 4 and 6 of the reference document--is provided on the Wind Erosion diskette as LCDXMPL.MET.)

6.3 THE ENTRY OPTION FROM THE MAIN MENU

When the user chooses this option from the MAIN MENU, the screen will clear and introductory information about the data requirements will be shown. Once this screen has been read, the following data items will be requested:

Description of inventory area
Emissions inventory year
Wind data year
English or metric units

The first data item requested, description of inventory area, should be a description of the source inventory boundaries. Once these data values have been entered, the screen will clear and the following source description data items will be requested:

Source ID
Source life
Pile or flat area

Source life asks for the start date and end date for which emissions are to be calculated. In this way, monthly, seasonal, or annual emissions may be obtained. Dates are referenced by "day of the year" (e.g., January 1 is

day 1, February 1 is day 32, etc.). No special provision is made for leap years.

If a flat area is indicated as the source, then the surface area is requested. If, however, a pile is entered, then the user must indicate whether the pile is conical or oval, as well as enter the pile height and diameter. For more information on this material, see *Control of Open Fugitive Dust Sources*, EPA-450/3-88-008.

Once these data values have been entered, the screen will clear and the following data items will be requested:

Erodible surface material
Moisture content
Silt content
Threshold friction velocity
Roughness height upwind of source

Erodible surface material refers to the description of the aggregate that is being eroded.

If the user wishes to employ an alternative method of determining threshold friction velocity, then "9999" should be entered for the friction velocity (the screen contains a footnote reminding the user of this convention). Then the user will be asked to supply the aggregate size distribution mode and silhouette ratio (individual HELP files are provided for these terms).

Each regular surface disturbance must be related to a disturbance frequency and affected pile subarea. After the previous data have been entered, the program will request data on pile disturbances for the highest Us/Ur wind speed regime. For a conical pile, the highest Us/Ur is 0.9; for an oval flat-topped pile, the highest Us/Ur value is 1.1. Flat areas have a uniform exposure.

Days between disturbances
Type of disturbance
Percent of area disturbed

Days between disturbances refers to the number of days between routine, consecutive disturbances of the pile surface.

Type of disturbance is a text field used for describing the disturbance, such as "loadout" or "pile maintenance."

Percent of area disturbed refers only to the area of the specific Us/Ur regime displayed on the screen. The areas corresponding to different Us/Ur regimes are shown on Figure 1 for conical and oval piles. (NOTE: For flat areas, there is only one exposure regime and Us/Ur = 1.) Thus, if 20% of the subarea corresponding to 0.9 [which is 12% of the total area in Figure 1] is disturbed every day, the computer program will calculate that

$$0.2\ (0.12) = 0.024 = 2.4\%$$

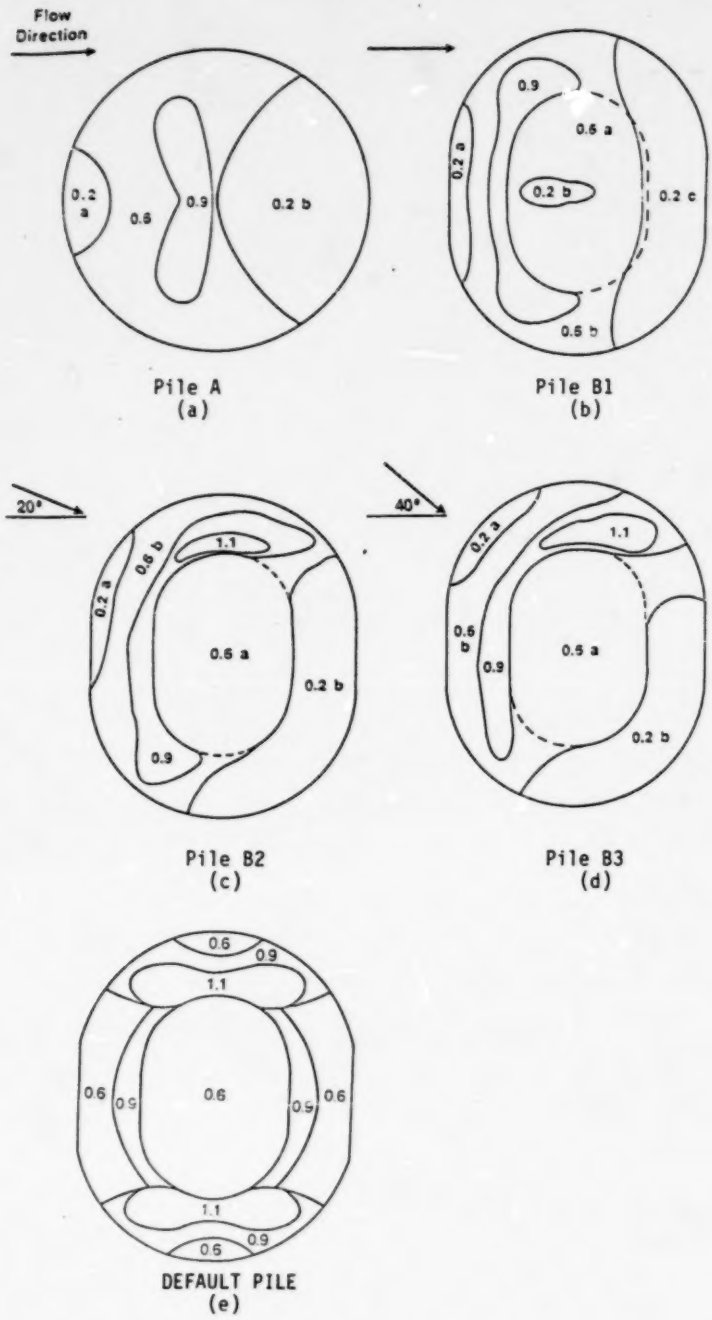


Figure 1. Us/Ur regimes for conical- and oval-shaped piles.

of the TOTAL pile area is disturbed every day and subject to a 0.9 value of Us/Ur.

When all of the data have been entered, a "999" should be entered in the "days between disturbance" field to signal the end of the data. Once all the Us/Ur regimes have been considered, the data entry process is completed and the user is given the option to enter more data or return to the MAIN MENU.

6.4 THE VIEW OPTION FROM THE MAIN MENU

This option allows the user to review, modify if necessary, and process any data which have been entered using the ENTRY option previously discussed. When this option is chosen, the user will first be asked to indicate which wind erosion category is to be VIEWed. The choices offered are:

Flat areas
Conical piles
Oval-topped piles

When the category is picked, only those files corresponding to the chosen category will be listed. The user is then asked to enter the complete name of the data file to be used. Once the data file has been selected, a list of fastest mile of wind data files will be given. The user should select an appropriate wind file from this list. Once both the source data file and the wind data file have been selected, the program presents the data and the calculated emission rates in a spread sheet format. At this point, the user can view the data and make changes in the data by simply following the on-screen instructions. Obviously, most changes would be expected to affect the emission rates (this is a major reason why a user would make changes in the data). However, the program does not automatically update the emission results (the user must press F9 to update). Since updates generally take a considerable amount of time to accomplish, it is suggested that the user not update unless several data values have been changed.

Controls based on wind speed reduction (e.g., wind fences, sheltering) may be considered by entering a value in cell A61 (see instructions given above this cell). Controls that affect the threshold velocity (U*t) may be considered by varying the entry in cell A12.

Once all of the changes have been entered and the user has exited the spread sheet, a summary of the final input data and the calculated emissions is offered. The user can view these files by using the page-up and page-down keys. When these files have been viewed, the program will ask (a) if the user wants a hard copy of the data and (b) if the user wants to save the changes which have been made. Please note that if the changes are saved, the old file will be overwritten. At this point, the user can VIEW more data or return to the MAIN MENU.

NOTE: The erosion emissions calculated using this program may be considered as conservatively high for the following reasons:

1. A disturbance on a given day is assumed to be subject to wind events anytime on that day, and on at least one day after the disturbance, up to (but not including) the day of the next disturbance. For example, in the case of daily disturbances, both the fastest mile values for a given day and the day following are considered, and the higher value is assumed to apply to the disturbance on the given day. This assumption is made because of the difficulty of tracking the time of occurrence of each disturbance in relation to the times of occurrence of the adjacent fastest mile events. This approach is slightly different from the one presented in the reference document, in which each day is considered separately. In general, the approach taken in the computer program produces relatively minor differences for surfaces that are infrequently disturbed (i.e., weekly or less often). While there is a potential for overestimating wind erosion from frequently disturbed surface (e.g., dirt parking lots), it is important to remember that the disturbances themselves (e.g., vehicles traveling within the lot) typically generate far more particulate emissions than does wind erosion.

2. For oval piles, an additional conservative assumption may be made to account for the asymmetry of the source. Figure 1(e) in this manual is based upon Figure 4-3 of the reference document, with the exception that high wind regimes have been enlarged to account for the possibility that the fastest mile might occur from any wind direction.

3. Lower bounds for the correction factor given in Figure 6-3 of the reference document are used to account for nonerodible elements.